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Fall 2006

Fall 2006 ChE Newsletter

Department of Chemical Engineering, Michigan Technological University

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CPM awarded First Place in Competition

The Consumer Product Manufacturing Enterprise™ was awarded first place in the Engineering Enterprise competition at the annual Undergraduate Exposition in April. The Engineering Enterprise program, according to the MTU website, "gives teams of students the opportunity to participate in real-world settings to solve engineering, design, and communication problems in partnership with industry sponsors." CPM received a \$300 cash prize for its top-rated efforts.

Housed in the Chemical Engineering Dept., CPM beat 22 other enterprises in the Poster and Presentation category with its 2005-2006

project, a small-scale canning machine design. The canning machine project was undertaken for the Keweenaw Brewing Company, a Houghton microbrewery. KBC co-owner and MTU alum Richard Gray has provided financial support for the project, which is expected to produce a design appropriate to meet the canning needs of mid- and small-size beverage producers. Major funding for CPM comes from the Kimberly-Clark Foundation, which also

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New Inductees for Chemical Engineering Distinguished Academy Honored

See page 3



CPM representatives pose in their laboratory.

Left to right, Dana Bowlby, Adetoun Ayorinde, Dr. Sean Clancey (co-advisor), Tiarah Winston, Roberta Larsen, Dr. Tony Rogers (co-advisor)

Letter from the chair –

Pardon our dust! The Chemical Sciences and Engineering building is undergoing a major \$1.3 million dollar upgrade, the first since it was built in 1968. Last fall, when state physical plant funds became available, we had a classroom renovation proposal prepared and were able to respond promptly. Working with the administration and facilities group, we have planned and carried out a major renovation of all the public areas and classrooms in our building. We now have new furniture and the best teaching technologies available in all of our classrooms. We take our reputation as one of the best programs for undergraduate engineering education seriously, and we continue to improve our excellent undergraduate training.

Over the past year:

- Our department has instituted a new minor and courses in bio-process engineering.
- We have redesigned our process control curriculum to incorporate a studio laboratory experience. We have invested in new computer facilities and software, and have proposals in place to fund a new dedicated process control lab.
- We have revised and implemented a new one semester thermodynamics course.
- We have hired a new instructor, **Katie Torrey**, to concentrate solely on academic advising.
- The engineering communications course in our department has continued to receive strong



industrial support, and is now being adopted by other engineering departments.

- For the last 2 years, 3 of the 12 finalists for the outstanding teaching award were from our

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Letter from the chair-

Continued from page 1

We are also continuing to enhance our status as a leader in chemical engineering research. We have focused with great success on 4 major areas of research: bio-processing, alternative energy, mineral processing, and polymers. To accommodate this growth, we have just completed a research laboratory renovation of over \$200K. We have devoted a portion of this newsletter to discuss the research currently going on in the department in greater detail. A few of the highlights include:

- We have obtained a second congressional earmark for \$500K and other funds to help rebuild our departmental research infrastructure, which had fallen into disrepair. Using these funds for infrastructure and "seed money" has been very successful, directly resulting in 3 major new grants from other sources.
- **Drs. Gerry Caneba and David Shonnard** have received and suc-

cessfully started a significant new materials research project well in excess of \$1 million.

- Our strategic efforts in Alternative Fuels Research that we began 3 years ago have positioned us well to be a major player for the rapidly growing research in this area. We have received a major NSF grant for the "wood-to-wheels" program, which places us at the forefront of the bio-processing field.
- **Drs. Komar Kawatra and Tim Eisele** continue to conduct nationally recognized research in minerals processing and sustainable use of resources.
- Overall, our total research expenditures reached approximately \$3 million this year, and we continue to be among the most productive departments in the graduation of Ph.D. graduates at MTU.

Our department also continues to be a place where employers know they can find the best-prepared chemical engineering graduates. We now have a 16-member Industrial Advisory Board that is actively engaged in our depart-

ment and assessment process. This was especially important during our recent successful accreditation visit.

Our relationships with both our old industry friends and several new ones have been growing. This is showing up in increased support and student employment. We are especially grateful to the Grain Processing Corporation, which has agreed to fund our seminar series for the next 5 years. In this series, we have been able to bring the top chemical engineers and scientists to Michigan Tech to speak to both our undergraduates and graduate students.

I hope you will take the time to read through the newsletter and discover more about what has been happening in the Department of Chemical Engineering at Michigan Tech. Also, please let us know what is happening in your life by filling out and sending in the Alumni and friends update card attached at the end of this newsletter.



Dr. Michael E. Mullins
Chair and Professor

Sandell Recipient of Distinguished Teaching Award

"He is a great teacher, and has a very good personality. He will try his hardest to help you succeed."

"At my 4 year stay at MTU as a chemical engineer, Dr. Sandell has been the most helpful and understandable professor I have had."

"He goes out of his way to help students."

"He puts our education and success first."

These are a sampling of student comments that helped Associate Professor John Sandell become the recipient of the university's 2006 Distinguished Teaching Award. The award is given each year by the Center for Teaching, Learning, and Faculty Development to faculty in two categories: Professor/Associate Professor, and Assistant Professor/Lecturer. Award winners are

chosen from a list of 10 finalists, 5 in each category.

The finalists are chosen based on a review of more than 45,000 teaching evaluations. The award winner is then selected by a committee made up of faculty, staff, and student representatives. The decision is made following a canvassing of the finalists'



current classes, during which the students are asked why the finalist should win the award. Comments from the general university population, including alumni, are also solicited. The winner receives a \$2,500 cash award.

Dr. Sandell, a several-time finalist, came to the Chemical Engineering department from the School of Technology, and maintains a position as adjunct associate professor in the Civil and Environmental Engineering department. He has also been a recipient of the Faculty of the Year award from the MTU chapter of the American Society of Civil Engineers. John is a deserving recipient, according to William Kennedy, director of the Center and chair of the selection committee. John "...has exhibited excellence in the classroom," wrote Kennedy in an e-mail.

New Inductees Honored

Established in 1995 to recognize alumni and special friends of the department, the Distinguished Academy of Chemical Engineering has inducted numerous honorees who have obtained the highest levels of leadership in their careers, communities, and society as a whole. We are pleased to announce the six new members inducted for 2006:



Dr. Edward R. Fisher

Ed was born in Detroit, Michigan in 1938. In 1943 he moved with his family to Oceanside, California just north of San Diego where he completed his early schooling. He graduated from MiraCosta College in 1958, from the University

of California, Berkeley in 1961, and from Johns Hopkins University in 1965 with a Ph.D. in Chemical Engineering Science. After a year at the H.C. Orsted Institute of the University of Copenhagen, Denmark, he joined the General Electric Space Sciences Laboratory in King of Prussia, Pennsylvania. Ed began his academic career by

joining Wayne State University in 1968. He became Professor in 1974 and Associate Dean for Research and Graduate Programs in 1978. In 1985, he joined Michigan Tech as Professor and Chair of the Department of Chemistry and Chemical Engineering. After thirteen years as chair of Chemical Engineering and one year as Interim Dean of Engineering, Ed retired in 2003 as Professor Emeritus. After retirement, Ed continues to be active by serving on committees of the American Chemical Society in support of chemical technician education and as a Life Trustee of the Michigan Tech Fund. He also is active in village governance as an elected member of the Lake Linden Village Council and as a board member of the Lake Linden Downtown Development Authority. Ed has a small but growing wood crafts business and supports his wife Nancy in her retail business, Yarns & Threads, in yarns, knitting, fabrics, and related fiber crafts. Ed and Nancy live in Lake Linden and have five children and four grandchildren.

Thomas P. Meinz

A native of Escanaba, MI, Mr. Meinz was awarded his B.S. in Chemical Engineering from MTU in 1969. He then began what is now a 37-year career with the WPS Resources Corporation, serving as a power plant engineer and an engineer for the Kewaunee, WI, nuclear plant start-up. From 1974-1986 he held the position of Director of Environmental Services, and in 1986 was named Director of Power System Regulatory

Projects. In 1989 he became Director and President of the Wisconsin River Power Company, which owns and operates the Castle Rock and Petenwell flowages with the Wisconsin Power and Light Company.

In 1996 he added the title of Director and Vice President of the Wisconsin Valley Improvement Company, which regulates the Wisconsin River watershed. Since 2000, Tom has become Executive Vice President of Public Affairs for WPS, and Chairman of the Upper Peninsula Power Company, which provides electricity to a 4,500 square mile area in the U.P. Additionally, he serves

as Director of WPS Services and Director and Vice President of the charitable WPS Resources Foundation, and holds Directorships of Michigan Gas Utilities and Minnesota Energy Resources. His community activities include service on the Board of Advisors of the Greater Green Bay Salvation Army and as Commissioner of the Green Bay Metropolitan Sewerage District. In 2003 he served as director of a company that among other responsibilities manages the Resch Center in Green Bay and the Brown County Arena. Married to his wife Susan for 38 years, the couple have two daughters, Jen, a chemical engineer, and Sara, a physician.



New Inductees Honored *Continued*



Manila G. (Bud) Shaver

Mr. Shaver, a retired Major General in the United States Army, is a 1955 graduate in chemical engineering from Tech. Upon graduation, he was commissioned a 2nd Lieutenant, Artillery. Over the subsequent years, with periods of active and reserve duty,

he was employed as a chemical engineer, salesman, marketing manager, and manager of the 3M Company's Resource Recovery Department. In that capacity, from 1981 to 1987,

Mr. Shaver reports that it would have taken more than

one billion dollars in sales to produce the pre-tax income that 3M's US Divisions realized from the surplus disposal activities of that department. While in the Army, Mr. Shaver received the General John J. Pershing award as a Distinguished Graduate of the Army's Command and General Staff College at Fort Leavenworth, KS. He is also a graduate of the Army War College at Carlisle Barracks, PA.

Upon retirement from 3M in 1990 and relocation to North Carolina, Mr. Shaver has been a past president of the Moore/Sandhills Coalition for Human Care, a coalition of churches which provides emergency care to those in need, and past president of the local Sandhills chapter of the Military Officers Association of America. For his efforts in providing Christmas food baskets to the needy, Mr. Shaver was awarded a Patrick Henry Citation by the U.S. National Guard Association. Mr. Shaver is a co-sponsor of a law school scholarship fund that will award its first scholarships this fall. Manila, who has five children and twelve grandchildren, lives with his wife of 22 years in West End, North Carolina.

John J. Simmons

A native of Ironwood, MI, Mr. Simmons learned the basics of business at the age of 10 with two paper routes, and by the age of 13 he was operating five Sunday paper selling locations. He graduated Summa Cum Laude from Michigan Tech in 1953 with a bachelor's degree in Metallurgical Engineering. While at MTU, he was a four-year member and captain of the Michigan Tech boxing team, and was a member of Alpha Sigma Mu and the Tau Beta Pi and Blue Key National Honor Societies. Upon graduation, Mr. Simmons worked in the iron ore industry in Minnesota for six years as a plant manager and as the leader of a team that worked on the successful development of heavy media and cyclone iron ore beneficiation technologies. He then formed his own engineering company, Simmons and Associates, developing technology for such clients as Kennecott Copper Corporation, United States Steel Corporation, and the Ethyl Corporation.

Moving to North Dakota in 1969, Mr. Simmons managed several major construction projects until he returned to his own engineering firm to develop technology that would be the basis for the formation of Carbontec Energy Corporation and Thermo Technologies, LLC. Chairman and CEO of

Carbontec and Thermo Technologies, Mr. Simmons has more than a dozen patents in areas such as energy, coal, wood products, chemicals, and oil spill cleanup. Carbontec's synthetic coal technology is used to produce more than 12 million tons of synthetic coal per year, while Thermo

Technologies develops and markets super absorbent fire retardant polymers for the fire suppression and fire protection industry.

An Air Force veteran, John is a member of the American Institute of Mining and Metallurgical Engineers and is on the Board of Directors of the Theodore Roosevelt Medora Foundation. He received the North Dakota Entrepreneur of the Year Award from the University of Mary in Bismarck, ND in 2005. John resides with his wife of 52 years, Nancy, in Naples, Florida.



New Inductees Honored *Continued*



Thomas J. Smegal

Mr. Smegal received his bachelor's degree in chemical engineering from what was then the Michigan College of Mining and Technology in 1957, and graduated Cum Laude with a Juris Doctor from the George Washington University Law School in 1961. A

specialist in providing expert witness testimony in intellectual property disputes,

Mr. Smegal has been a frequent lecturer on intellectual property law and litigation at the Center for American and International Law and the Tuck School of Business at Dartmouth, as well as in educational seminars sponsored

by the state and national intellectual property law associations. Mr. Smegal was a partner in the San Francisco office of Knobbe, Martens, Olson & Bear from 1998, when he opened that office, through 2005, and now practices law in his own San Francisco firm.

He has been nominated by two presidents to serve on the Board of Directors of the Legal Services Corporation, and in recognition of his life-long dedication to delivering legal services to the indigent, the National Legal Aid and Defender Association honored him in 1987 as the recipient of its prestigious Arthur Von Breson Award. He has been long active in professional associations, including positions as President of the American Intellectual Property Law Association (1986); Chair of the American Bar Association Section of Patent, Trademark and Copyright Law (1990-1992), President of the Board of Directors of the International Association of Intellectual Property Lawyers (1995-2001). Mr. Smegal is the author of numerous articles regarding intellectual property law, and has practiced full-time in the field for 43 years.

Vincent A. Vellella

President and Owner of Veltec Corp., Mr. Vellella graduated from Michigan Tech in 1960 with a B.S. degree in Metallurgical Engineering. Mr. Vellella then signed on with the Republic Steel Corporation, where he worked on the development of ultra-pure flotation processes for the iron ore division and invented slag metal recovery systems.

He served as a consultant in the mid-60s for the Union Carbide Corp. and Materials Separators, Inc., both in Ohio, and for Inmetco in Ellwood City, Pa, eventually becoming the founder and president of the Pittsburgh Pacific Processing Co. From 1986 to the present, Mr. Vellella became founder and director of Veltec Laboratories, and served as director of the Western Pacific Technology Corporation and the Ferrous Environmental Recycling Corporation.

Other consulting positions include the Scientific Ecology Group of the Westinghouse Corporation and Rouge Industries, and other companies in Venezuela and France.

In all, Mr. Vellella has been a consultant in the mineral processing area for 15 corporations, and had held director or partner positions seven corporations. Mr. Vellella holds many professional memberships, including the metallurgical honor society Alpha Sigma Mu as a Tech student, the American Institute of Metallurgical Engineers, the Mining and Mineral Engineering Industrial Advisory Board, and the Metallurgical & Materials Engineering Academy. Mr. Vellella also served for four years in the U.S. Air Force, and was a Special Weapons supervisor. He currently resides in Moon Township, PA.



New Presidential Council of Alumnae Member



Jill M. (Caimotto) Meister

Jill graduated from Michigan Tech in 1988 with a bachelor's degree in Chemical Engineering and began an eighteen year career with UOP LLC in Des Plaines, Illinois. Her first position with UOP was as Development Engineer, followed by advancing positions of Technical Advisor,

Modular Systems Product Engineer, Modular Systems Product Manager, and Alkylation & Oxygenates Technology Manager. Since 2002 she has held the position of Senior Alkylation Specialist in the Development area.

As a senior specialist, Jill is responsible for preparing and delivering technical presentations and papers worldwide, as well as overseeing research and development projects to support these technologies. Jill has one patent for Hydrocarbon Recovery from Corrosive Effluent Stream,

two patents pending; and several Memorandum of Inventions with potential for future patents. Additionally, she has published in several trade magazines and books, and has presented at trade conferences around the world on alkylation and oxygenate technologies. This March Jill presented at the National Petrochemical and Refinery Association (NPRA) Annual Meeting. She presented at the 2005 Science Career in Search of Women Conference at Argonne National Laboratory, the Japan Petroleum Institute (2004), and the Harts Conference (2000).

While a student at Michigan Tech, Jill was a member of the Michigan Tech Student Foundation and the American Institute of Chemical Engineers. After graduation, Jill has continued her involvement with the University, serving on the Michigan Tech Alumni Association Board of Directors from 1994 until 1998; since 1989 she has served as the Treasurer of the Chicago Chapter of the Michigan Tech Alumni Association. In her community, Jill and her husband, Peter, have been a presenting couple at Discovery Weekends for the Archdiocese of Chicago since 1994.

Jill and her husband reside in Elk Grove Village, Illinois with their daughters Michelle and Jessica.

Alumni notes

Joshua Ackerman, - Grad Year 2004 - I have worked with BASF at their steam cracker in port Arthur, TX and MDI unit in Geismar, LA. In January I'll be moving to Wyandotte, MI to work in Amino Resins. By mid 2006 I'll be posting internally for a more permanent location.

Lori Andersin, (Hodgkinson) - Grad Year 2000 - I had a baby girl on August 16, 2005, and named her Avery Tatum.

Lawrence D. Carbary - Grad Year 1982 - June 2005 I was awarded the ASTM Committee C24 Sealants Hall of Fame Award. This was in recognition of 23 years of construction sealants experience, national and international construction experience, and numerous publications in Industry Journals. I encourage other Chem E's to look at the construction industry as a career.

Ray Darby & Laura Krehn - Graduation Year 1984 - Ray and Laura have been granted New Zealand citizenship in March of 2006. They continue to live aboard their yacht "Ariel" and enjoy sailing and hiking.

Bruce G. Davey - Grad Year 1965 - I retired in 2/04 after 30 years with Lonza Inc. The last 14 years I was Plant Manager of their Illinois facility. I built a new home and moved to New London WI. I'm currently volunteering 3 days a week at the soup kitchen/food pantry and local animal shelter.

Michelle Fitzgerald - Grad Year 1996 - I completed my MSE in Mechanical Engineering from the University of Michigan in April 2000 while working for Chrysler in Auburn Hill, MI. I continued my education by completing an MBA in April 2005 from the Ross Business School at the

University of Michigan and accepted a position with the Boeing Company in Seattle, WA where I am currently working on structural testing for the 787 air frame.

Sarah Garchar (Wakely) - Grad Year 2002 - I married Bryan Garchar, an electrical engineer working for General Motors on 9/4/05. I have recently started a new job working as a process engineer for Lyondel Chemical Company in Astabula, OH. We are living in Youngstown, OH.

James & Kristin Jensen (Minich) - Grad Year 2002. Married June 20, 2003, the couple lives in Anchorage, Alaska. James is a process engineer for the Emerald Consulting Group, and Kristin is a process engineer for BP. Prior to taking his process engineering position, James was a meteorologist in the U.S. Air Force.

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Industrial Advisory Board

The Industrial Advisory Board is an indispensable means of seeing that we are keeping our program top-notch. This board meets semi-annually to "consult on ideas and visions that will continue to keep our chemical engineering program in tune with the long-term needs of the chemical and materials processing industries". We would like to thank the following people for their willingness to serve on this board:

Mark Mleziva
Kimberly-Clark Corporation

John Wright
Pfizer Inc.

Ron Carroll
Cambrex Corporation

Gene Chamberlain
Archer Daniels Midland

Susan L. Korpela
3M

Dave Reif
Emerson

John Sparks
Grain Processing Corporation

Wayne E. Enderle
BASF Corporation

James Sanderson
Dow Corning Corporation

William Hammack
University of Illinois

Mary Korpi
Newmont Mining Corporation

Chris Gosling
UOP LLC

Karen Mikkola
Mosaic

Joseph Carrabba
Cleveland-Cliffs

Scott Collick
Dow Chemical

CPM Awarded

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provides mentoring for project teams.

CPM is advised by faculty members Tony Rogers and Sean Clancey. Student officers for the award-winning project were Roberta Larsen (President), Michael Baker (Vice-President), Adetoun Ayorinde (Secretary), Jessica Ruth (Treasurer) and Danielle Schneider (Documentation). The CPM team showcased their project at the Expo with a root-beer can filling demonstration that proved popular with onlookers. CPM's winning project built on a tradition of success. Since its founding in Fall 2000, CPM has won two other first-place awards in the Poster and Presentation category, and has been the co-winner of the Management Team of the Year award.

The project will continue next year under the leadership of President Laura Strokirch and Vice-President Ruth. CPM will have the use of KBC's current canning machine, which is being taken out of service. One focus of CPM's work, besides upgrading the old machine with sensors that identify improperly-filled cans and a computer-controlled system to overcome other canning faults, will be designing and building a depalletizer for full-size pallets of cans and a rinsing and drying station for filled cans.

These additions are expected to be used on canning machines at KBC's new South Range canning facility. "I'm looking forward to working on the project again this fall," Strokirch said. "It's exciting to be part of a project from start to finish."

Alumni notes (Continued)

James Johnston - I married Angela Campau, class of 2000 grad in CLE. Our daughter Jane was born July 5, 2005. Jim works at Stora Enso and Angela works at Kimberly-Clark.

Mark Konecki - Graduation Year 1979 - As of January 2006 I transferred to BP's joint venture in Russia, whose name is TNK-BP.

Lisa Lindberg - Grad Year 1998 - I am now a Staff Engineer at Affyrnetrix in Sacramento, C A.

John Paige - Grad Year 1960 - I have relocated from Townsend, TN to Dublin, OH and enjoy hearing about Chem Eng activities at Tech. Keep up the good work.

Lisa M. Parks (Nemecek) - Grad Year 2000 - We had a new baby girl January 3, 2006, and named her Kaitlyn Rose.

Gene Renzaglia - Grad Year 1969 - Retired January 1, 2006, as U.S. Manufacturing Director for Elementts Chromium, a division of Elementts PLC.

Rahul & Rebecca Saxena (Puumala) - Grad Year 2001/1991 - Rahul is Sr. Research Scientist in Furniture & Floor Products at S. C. Johnson & Son Company in Racine, WI. Rebecca is a Chemist with Rustoleum Corporation in

Pleasant Prairie, WI. We have two daughters, Johanna (11) and Natasha (8).

Tina Schmiedel (Taylor) - Grad Year 1984 - I received an MBA from UW - Oshkosh. After 17 years with Procter & Gamble Operations Manager, I'm now working at Oshkosh Truck Corporation as Corporate Marketing programs manager. I married Gary Schrniedel, a 1983 MTU grad in ME, and have 3 children, Sarah, Rebecca and Jacob. Gary is Vice President, Advanced Products at OTC.

Melissa F. Sorensen. (**Golembiewski**) - Grad Year 1997 - My second child was born October 11, 2005, and named Andrew John. My first child, Matthew Dean, is now two years old.

Scott Stachowiak - Grad Year 1995 - I am a manufacturing and quality engineer for Dow Coming. My wife, Aimee, and I have two children. Brendan was born in October 2003 and Lydia was born in June 2005.

Daniel P. Starin - Grad Year 1958 - Passed away 10/20/05.

Rick Stevens - Grad Year 1987 - I received an MS

Continued on next page

Nam Kim Retires



Nam Kim

Nam Kim retired effective June 30, and is now Professor Emeritus. Dr. Kim graduated from National University in Korea in 1964, and pursued a career in engineering for 15 years before receiving his PhD from Montana State University. Since coming to MTU in

1982, Nam has excelled in research and teaching. His accomplishments have included bringing in more than \$600,000 in research grants, co-authorship of 11 refereed publications, sole authorship of two textbooks, and the receipt of three U.S. patents, including one for a superfastener, awarded in 1986. His research interests were centered around process control and energy conservation and optimization.

A finalist for MTU's Distinguished Teaching Award, and an inductee into both Who's Who Among America's Teachers and The Best Teachers in America, Nam says that his teaching philosophy was based on creating a positive environment for his students. "I've been excited and enthusiastic about teaching," he said. "I looked at myself as more of a 'big brother' figure rather than as a course instructor. I encouraged students to ask questions without fear."

University service was also one of his hallmarks, including his work in promoting diversity as a member of MTU's holiday committee. The committee recommended that the university celebrate the holidays of more of the world's religions than just Christianity. "There are a number of other religions that embrace all kinds of cultures," Nam said. "We wanted to give other religions their opportunity to display themselves."

A 7th degree black belt holder in Taekwon-Do, Nam enjoys drawing, water color, and skiing. Nam will also continue to keep his hand in teaching, leaving in August to spend a sabbatical year teaching chemical engineering at Chonnam National University in Korea. Along with his teaching, Nam says that in his retirement "I'll be actively involved in serving society, especially helping people who cannot help themselves."

Building Renovations completed



"Visitors to the Chemical Sciences and Engineering Building will see this newly renovated first-floor hallway, a part of the building renovations that were completed this summer."

Alumni notes *(Continued)*

Engineering Technology degree 5/05 from the University of Memphis. I was promoted to Corporate Quality Manager at Associated Rubber Company in Tallapoosa, GA in July 2005. I moved to Tallapoosa with my wife Stacy.

Lynn Sygnecki - Grad Year 2001 - I moved to Osaka, Japan to continue work on a lightemitting polymer project which was transferred from the Dow Chemical Company (Midland, MI) to Sumitomo Chemical Co., Ltd. Via a business acquisition. I will work in Osaka for one year in the Process & Production Technology Center at the Osaka Works plant.

Steven Weiss - Grad Year 1965 - I began a sales marketing effort for a start-up company, Advanced Separation Technologies in 1999. In 1996, sold company and retired in 1999.

Focus on Research

By Jason Keith, Associate Professor and Graduate Program Chair

Today's Michigan Tech is a lot different than the Michigan Tech you studied at. The university is focusing more and more of its resources in research and graduate education while maintaining excellence in its undergraduate programs. Within the Department of Chemical Engineering, we have been working on several exciting research projects which engage our students at a whole new level. A listing of major projects is summarized in the following table. Some projects are highlighted in our spotlight articles. If you have any questions or know of some promising

graduate students, drop me a line at jmkeith@mtu.edu.

Researchers Receive \$1.7 Million Grant to Create Light, Strong Green Foams

Michigan Technological University researchers have been awarded \$1.7 million to develop structural foams that could be used in security applications.

The 15-month Phase 1 contract was awarded by Raytheon Company as part of a \$3.7 million program funded by the Defense Advanced Research Projects Agency (DARPA) to develop lightweight, portable barriers that could be used to help protect vulnerable targets and provide safe crowd control.

"We need very strong and light-

weight barriers that could be erected quickly at any location and can be removed very quickly, and we can do that with polymer foams," said principal investigator Ghatu Subhash, a professor in the Department of Mechanical Engineering-Engineering Mechanics. "They will also be environmentally benign, fire-resistant, and pose no health hazards."

The research is being conducted through Michigan Tech's Center for Environmentally Benign Functional Materials (described below) and its Sustainable Futures Institute. Co-principal investigators on the project are associate professor Gerard Caneba and professor David Shonnard, both of the Department of Chemical Engineering.

Agency & Dates	Description	Chemical Engineering Investigators	Chemical Engineering Funding (est.)	Other Information
NSF 2005-2010	Material Use – Science, Engineering, Society (MUSES)	Shonnard	\$293,000	Collaboration between forestry, engineering, social science
NSF 2004-2009	Integrated Graduate Education and Research Training (IGERT)	Shonnard, Keith, King, Holles, Rogers	\$1,500,000	Collaboration with Sustainable Futures Institute
DARPA 2006-2007	ReBar (Reversible Barriers)	Shonnard and Caneba	\$1,100,000	Collaboration with Mechanical Engineering
NSF 2005-2008	Thermoplastics for Fuel Cell Bipolar Plate Applications	King and Keith	\$300,000	Collaboration with Dana Corporation
Dept. of Education 2002-2006	Graduate Assistantships in Areas of National Need	Kawatra, King, Eisele, Rogers	\$742,000	PhD fellowships
DOE 2002-2006	Energy Efficiency in Iron Making	Kawatra and Eisele	\$548,000	
AIChE Since 1991	Thermodynamic Data and Structure-Property Estimations	Rogers	\$40,000 per year	
USAID	Unison-MTU program	Barna	\$300,000	PhD fellowships
Caterpillar	Bio-based Energy Technologies	Shonnard	\$150,000	Collaboration between forestry, engineering, and social science

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Focus on Research *(Continued from previous page)*

Center for Environmentally Benign Functional Materials Established

As part of the \$1.7 Million DARPA grant, the Center for Environmentally Benign Functional Materials (CEBFM) has been formed. The center will have high throughput experimentation (HTE) equipment, which will facilitate the completion of a large number of chemical engineering experiments with the assistance of a few dedicated manpower resources. It is an offshoot of the combinatorial analysis methods that were developed and used to complete the human genome project way ahead of schedule. Currently envisioned HTE systems in CEBFM include:

1. A robotic arm system for multiple fluids dispensing, within a controlled-atmosphere and enclosed chamber for handling dangerous chemicals. The same robotic system can be fitted with an automatic solid weighing and dispensing station.
2. A shaker system for multiple position block experiments.
3. A 64-position block heating/cooling system for simultaneous atmospheric physical and chemical transformation experiments.
4. A 25-position block heating/cooling system for simultaneous medium pressure (up to 8 atm) physical and chemical transformation experiments.
5. A 20-position high pressure block heating/cooling system for simultaneous physical and chemical transformation experiments.

HTE is one of the new trends in the chemical industry, which is being implemented across the board in order to reduce the foreign outsourcing of research activities. The experiments are of small scale and high efficiencies that they are suitable as teaching tools for concepts in thermodynamics, chemical kinetics, transport processes, and control systems.

Researchers Investigate New Materials for Fuel Cell Bipolar Plates

Associate professors Julie King and Jason Keith are working with graduate students Michael Miller, Rodwick Barton, and Rebecca Hauser on polymer composites for fuel cell bipolar plate applications. The researchers are using a liquid crystal polymer with multiple carbon fillers to achieve high thermal and electrical conductivity. Testing is also being performed on the tensile strength and rheology (in collaboration with associate professor Faith Morrison) of the new materials. The work is funded through the United States Department of Energy, the National Science Foundation, and the Michigan Space Grant Consortium. Significant technical input is being provided by Dr. Eve Steigerwalt of Dana Corporation. Graduate students are funded through grants from the National Science Foundation and from the United States Department of Education. King and Keith have also worked with 20 undergraduate students in their laboratory since the program inception.

Alternative Bio-Based Fuels and Chemicals

Professor David Shonnard is involved in a multidisciplinary NSF-funded research project to investigate renewable fuels from forest resources. His involvement in this project covers research to improve the conversion of woody biomass to soluble sugars and then fermentation of these sugars to ethanol. The graduate students (1 MS and 1 PhD) will investigate dilute acid pretreatment of the wood to determine kinetic parameters that will lead to a better mechanistic understanding of the reactions and to higher yields of fermentable sugars. Another aspect of the research will develop improved cellulases (enzymes to degrade cellulose to glucose). Life cycle assessment research of the wood-to-ethanol

process will focus on developing inventory data for different forest management alternatives.

Hydrogen Combustion Update

Hydrogen has been proposed as an alternate energy source for the future. The main motivation for using hydrogen is due to the fact that hydrogen combustion produces only water vapor as a product without producing any carbon dioxide. Carbon dioxide has been implicated as a major component to global warming.

Hydrogen is a flammable gas and, as such, requires special storage and handling procedures to prevent a fire or explosion. These safety requirements depend on a full understanding of the flammability and combustion behavior of hydrogen. Unfortunately, the publicly available flammability data for hydrogen is very outdated and incomplete.

Herbert H. Dow Professor for Chemical Process Safety Daniel Crowl is working with visiting professor Young-Do Jo from the Institute of Gas Safety Technology of the Korea Gas Safety Corporation on measuring hydrogen flammability data and understanding its significance towards a hydrogen economy. They are using the 20-Liter combustion sphere in professor Crowl's laboratory to obtain high quality hydrogen combustion data over a very wide range of stoichiometries and operating conditions. The data includes high precision pressure vs. time data.

To date, over 400 runs have been completed. This includes flammability triangles at 1, 1.25, 0.75 and 0.5 atm showing the flammable compositions. The results show that hydrogen has very wide flammability limits and burns with a very high burning velocity compared to hydrocarbon fuels. These data will be of enormous benefit to design safe hydrogen processes.



September 2005 Keweenaw Star Boat Trip, Sponsored by the Department and organized by Student Chapter of AIChE



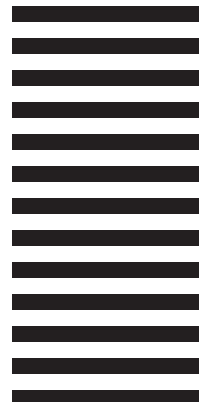
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